CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES
OF WILD FAUNA AND FLORA

Twenty-ninth meeting of the Animals Committee
Geneva (Switzerland), 18-22 July 2017

Species specific matters

Terrestrial species

Snakes (Serpentes spp.)

STANDARDS FOR PYTHONS TRACEABILITY

1. This document has been submitted by the Management Authority of Switzerland for consideration by the Animals Committee.*

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GS1 Switzerland

The Global Language of Business

Standards for pythons traceabilty

Comparison

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Disclaimer

About GS1

This report has been written by GS1 Switzerland, 3007 Bern, Switzerland, as member organization of GS1 AISBL.

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Thank you to Daniel Natusch (IUCN SSC BPSG) for technical input on python skin supply chains.

Management Summary

CITES and other UN agencies have made different studies about traceability of pythons skins these past 5 years. As a major standards organization for trade and traceability, GS1 (Global Standard One) has searched how standards could be successfully implemented along the python skin supply chain, even in remote areas, to link both information and goods flows, in complement to CITES permitting system.

As one of the goal of traceability is to deter illegal trade, this study is based on previous works (e.g. UNCTAD 2014 and IUCN 2012) and adopts UNECE cross-border traceability framework (2016) for process description, focusing on the first tier (range and intermediate countries).

Two scenarios are under review, based on:

1. Batch traceability: this basic scenario is used worldwide with GS1 Barcode for food traceability, with proven results;
2. Individual skin traceability: a more sophisticated scenario, based on event traceability. This system is now adopted by pharmaceutical industry to deter counterfeited drugs, under deployment in many countries.

As illegal trade flows are numerous and varied, either for circumventing quotas or local laws, both scenarios show the limit of a traceability system when all actors are not trustful. Study shows that they should be completed by authenticated methods, such as skinning patterns or tagging.

Nevertheless, tamper-proof tags used for crocodilians and anacondas mixing authentication and traceability are not a guarantee of legality, while illegal skins may enter the chain of custody right at the first step (processing facility).

This shows that traceability systems cannot be successful while illegal trade persists, but can mitigate the unofficial circuits.

Best scenario, when compared to minimum costs and requirements, as well as impact on legality of trade, appears to be batch traceability. Implementing this scenario and adapting management processes in range countries should significantly raise the bar against criminal energy and contribute to more accurate data for scientific findings.

GS1 recommends to examine the drivers of illegal trade, establish a holistic traceability and authenticity approach focused on a limited number of identification keys, and to proposes to establish cooperation between MA and MO (i.e. GS1 *non-for-profit* Member Organization established in most range countries) for capacity building.

Furthermore, GS1 proposes to increase cross-border collaboration by using the UNECE framework and improving integration of CITES permits, WCO single window and GS1 standards.

1 Introduction and aims

This report is a follow-up to the UNCTAD and CITES Secretariat co-commissioned study on Python Skin Traceability (Traceability Systems for a Sustainable International Trade in South-East Asian Python Skins 2013). The research and preparation of this report was funded by Kering, with technical input from experts working on the python skin trade.

The goal of this work is to:

- Inform how the implementation of management and traceability of python skin supply chains could be improved by using GS1 standards, in combination with taking other measures,
- Compare different scenarios in consideration of CoP 17 decisions (Resolution Conf 17.2.),
- Estimate the minimum requirements for the system to be most successful and the ratio cost/benefits of such a system.
- Focus the efforts of the CITES community on those factors most important for ensuring the effective implementation of traceability systems for pythons.

The report aims to achieve these goals by describing typical python skin supply chains, and examining two scenarios for traceability of python skins: (1) tracing batches of skins destined for export, and (2) marking and tracing individual skins destined for export. The report will compare the applicability of GS1 standards to these two different scenarios, and identify supply chain issues where the CITES community can focus effort to ensure adherence to the GS1 standard – and hence assurance of python skin traceability.

Why GS1 standards?

Implementing a traceability system within a supply chain requires all parties involved to systematically link the physical flow of materials and products with the flow of information about them. This requires a holistic view of the supply chain, which is best attained by deploying a common business language. While businesses recognise the value of traceability, they do not want multiple, potentially conflicting traceability systems, and they do not want to increase costs unnecessarily. Businesses also recognise that an individual company is only one partner in the supply chain, and that a chain is only as strong as its weakest link. In short, businesses want a traceability system that can easily be adopted by just about everyone in the supply chain.

The GS1 Traceability Standard meets these criteria: it defines business rules and minimum requirements to be followed when designing and implementing a traceability system, is full ISO and UN/CEFACT compliant, and is the most widely spread in the word[1].

GS1 system may address all CITES traceability issues for both flora and fauna. This study shows how GS1 system addresses specific python skins traceability challenges.

[1] To read more see Appendix 1

2 Python skins flows and challenges

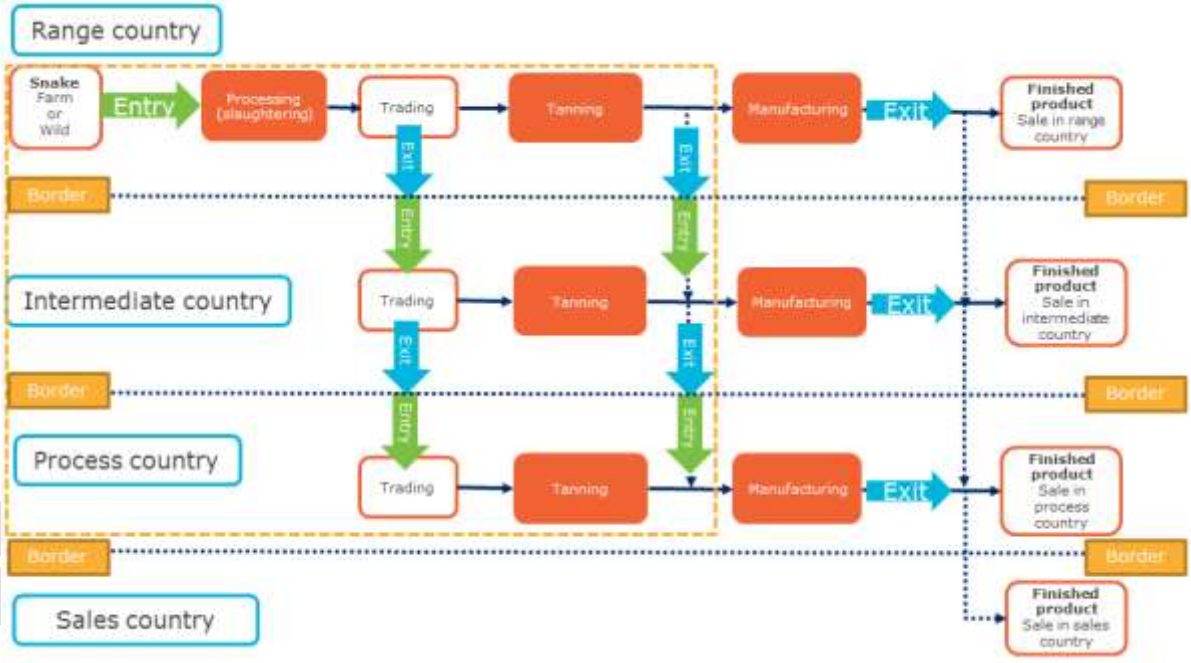
2.1 Physical flows

In this chapter, we describe both official and unofficial supply chain flows and the main risks for python skin trade traceability. By using the UNECE traceability framework for cross-border trade[2], we can divide the supply chain into four components (one component per country):

- Range country,
- Intermediate country,
- Process country,
- Sales country.

Python skin supply chains start from either wild or farm production systems and finish with the end product, as illustrated in Figure 1, showing entry and exit points.

Figure 1 : Python skins trade according to UNECE framework

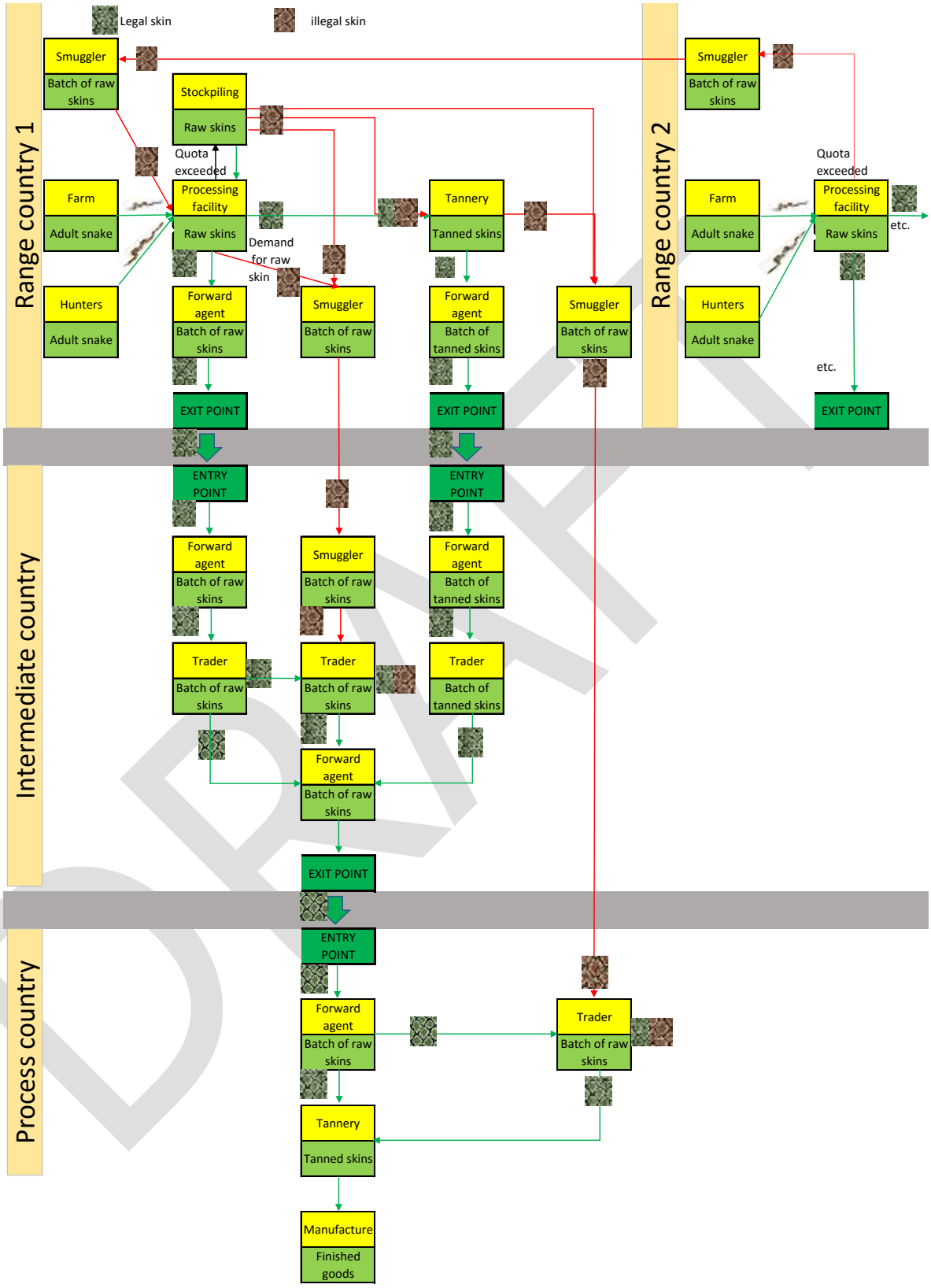


As recommended by earlier studies and working groups, focus is made on 1st tier, i.e. until tannery with a finished skin as end-product (orange frame).

The main goal of CITES is to ensure that trade is legal, traceable and sustainable, meaning that main illegal product flows should be identified and mitigated. Diagram 2 (based on earlier studies and python specialists' input) shows how both official and unofficial supply chains interact: products leaving the official circuit may re-enter through laundering operations.

[2] Traceability for Sustainable Trade: A Framework to design Traceability Systems for Cross Border Trade (ECE/TRADE/429) http://www.unece.org/index.php?id=43763

Figure 2: official and unofficial supply chains



Identified illegal trade flows[3], either in range and intermediate countries, or cross-borders, are explained below:

a. Circumventing quotas

Processing facilities reach their quota, but continue to purchase snakes from hunters. The snakes will be slaughtered, skins dried and stockpiled. Skins in excess of national quotas are sold to traders who find ways for skins to enter trade illegally. Some of those skins are smuggled to neighboring countries or export hubs where they are purchased by traders with no restrictions on the number of skins they can export.

b. Mixing skins in intermediate country

Intermediate countries are an important market place because they host traders who will respond to industry demand. For instance, traded batches are usually around 5 - 10,000 skins, but the customer wants skins that are all the same size. Mixing skins from different import permits (e.g., from different countries with different source codes) may be required to fulfill an order. In some cases, blind import permits[4] are used to match quantities on export permits.

In addition, some countries (Indonesia) have laws requiring skins to be tanned, at least at the first level (crust), before export. But some customers prefer to control the whole tanning process and thus only purchase raw (untanned) skins. Untanned skins are thus exported as originating from countries other than those from where they came.

2.2 Challenges

2.2.1 Achieving CITES goals

To goal of CITES is to:

- keep harvest levels within defined (sustainable) limits. A traceability system can link exports of individual skins back to harvest levels, thus ensuring exports are also within defined levels.

At present, the traceability system is based on CITES permitting systems, developed in 1973. A challenge is to complement such a system (which is still paper based in many countries) with a system that will provide the following tangible benefits:

- reduce the level of illegal trade to a low level,
- improve knowledge of harvest volumes to aid sustainability,
- run at an affordable cost at all stages of the supply chain,
- be easy to implement, especially in range countries.

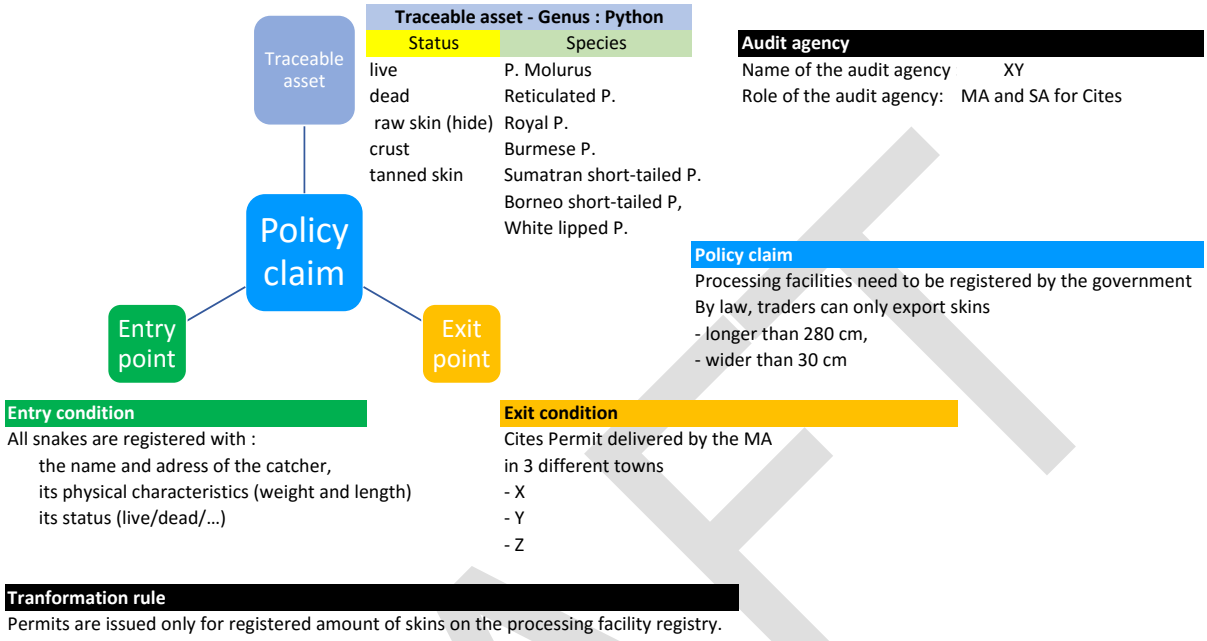
2.3 Complying with different national policies

An important roadblock is the adoption of different policy rules in countries, which can be described by using traceability system components[5], like in the example below.

[3] As criminal organizations have no limit, this is only a partial view of illegal trade.
[4] Blind permits refer to permits which are regularly issued by CITES MA but are not used. Export permit is issued by a country without quotas (farmed snakes) allowing an import permit in intermediate country. No goods are shipped, but the import permit allows

[5] Refer to UNECE Framework

Figure 3: Example of traceability component system



As each country has its own policy for endangered species, which is not dictated by CITES, an important level of subsidiarity should be given to range countries as long as their traceability system allows them to prove that the trade is legal and sustainable. The advantage of using standards is that systems are interoperable between countries, despite different laws.

2.4 Difference between traceability and authentication

It seems that there is often a confusion between both notions.

2.4.1 Traceability

Traceability is the ability to identify the past or current location of an item, as well as to know an item's history[6].

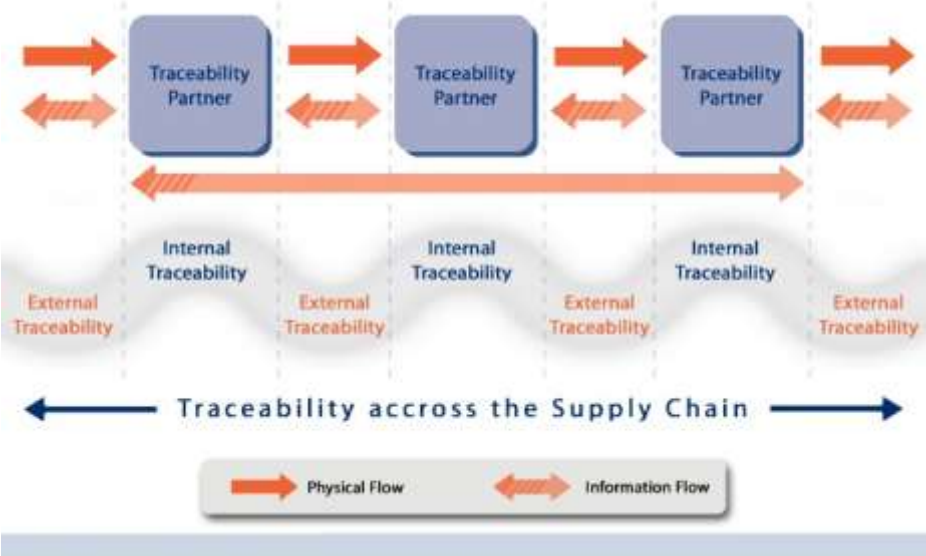
There are different levels of traceability[7], but only two of them comply with GS1 definition:

- Batch: the minimum requirement is to have an item generic number and a lot number
- Item (serialized): the maximum requirement is to have a serial number for each item.

In both cases, information must be exchanged between trading partners to ensure traceability in the supply chain, and each partner must have his own traceability system to ensure complete chain visibility.

[6] Full GS1 definition: Traceability is the ability to track forward the movement through specified stage(s) of the extended supply chain and trace backward the history, application or location of that which is under consideration.
Traceability allows for the identification of any past or current location and custody of an item, and knowledge of an item's history.
[7] Other concept such as mass-balance, book and claim, audit, are not considered as methods compliant with the above definition.

Figure 4:



2.4.2 Authentication

Definition[8]:The process or action of proving or showing something to be true, genuine, or valid. *'the prints will be stamped with his seal and accompanied by a letter of authentication'.*

Banknotes

Typically, banknotes are designed to be easily authenticated with visible security features[9]. The first authentication is visual, then it may be made at a second stage using specific equipment.

Crocodilians

The "traceability system" of crocodilian is quoted as reference because it is trusted by all parties. Actually, it is a combination of:

- Authentication: tampered proof tagging
- Traceability: CITES permitting system

A similar system for yellow anaconda is also working successfully in Argentina (YAMP). Both have in common:

- Precise locations (harvest in a community managed habitat or farms),
- Trusted partners along the chain of custody until skin is tagged[10].

But the tag will not allow back tracking on its own, i.e. giving the history of the route followed by the skin.

[8] Oxford dictionary on line
[9] For Euro banknotes, most security features are instantly accessible through "feel, look and tilt"
[10] In case of yellow anaconda, skins are tagged after hunting and retagged after stockpiling. There is a hierarchy (Local Buyers -> Main Buyer ->) which orientates the product flow. In the case of pythons, there is a network with many transversal flows between processing facilities which does not allow a strong chain of custody.

2.5 How traceability systems may also bring authentication

Access to real-time status information becomes more and more the norm, and is supported by EPCIS standard designed by GS1 and approved by ISO[11].

EPCIS data consist of "visibility events," each of which is the record of the completion of a specific business process step acting upon one or more objects.

The approach starts with defining visible events data, for any event happening in the supply chain process, by answering 4 questions:

What? Means the product: e.g. Python Molurus tanned skin

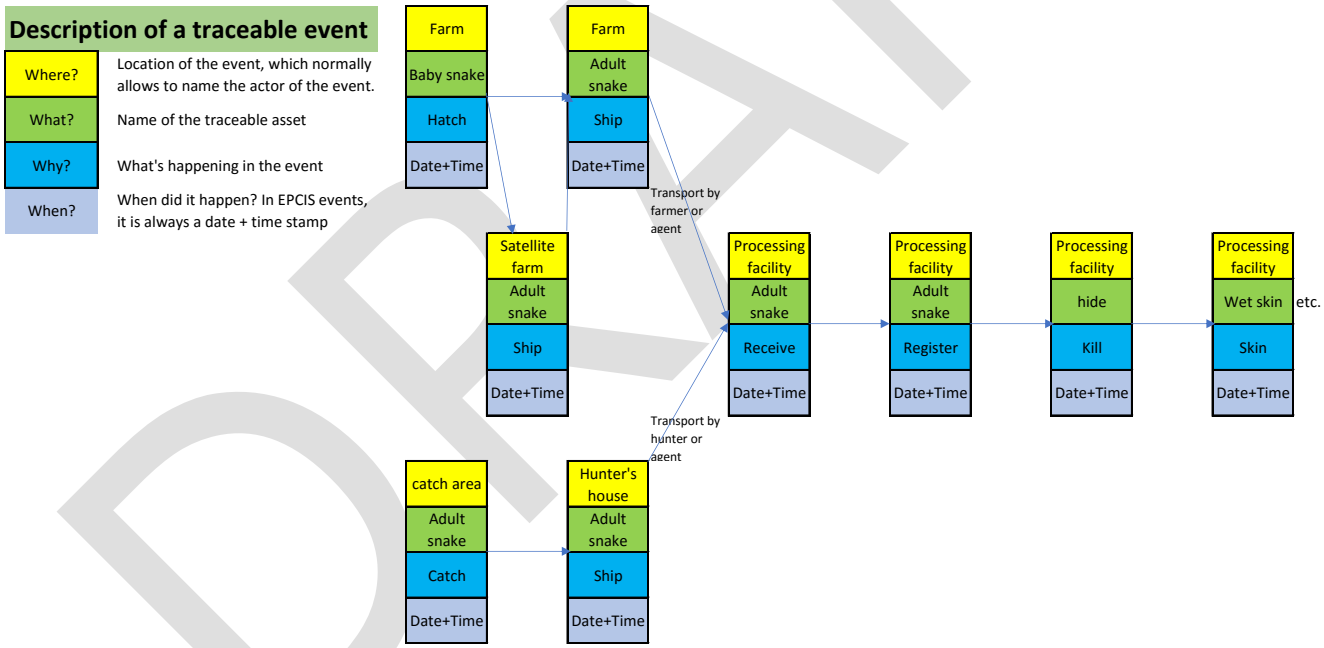
When? Is the date and time of the event

Where? Defines the location of the event

Why? for example slaughtering, skinning, tanning.

Nevertheless, the conditions for effectiveness are adequate IT infrastructure and the use of standards, allowing real-time links with such event-data. An example for python skin supply chain is given in figure 4.

Figure 5: Visible supply chain events (example)



Event-base traceability is being deployed worldwide for the pharmaceutical industry, due to prominent level of counterfeited medicines (up to 50% in the **legal market** of some countries) and related healthcare issues. GS1 standards are compulsory in EU, USA, Brazil…

[11] ISO/IEC 19987:2015 https://www.iso.org/standard/66796.html

3 Python skin trade traceability scenarios

3.1 GS1 system of standards

The GS1 system architecture is based on three concepts that are linked to each other:

- Standards to IDENTIFY entities in electronic information that can be stored and communicated between trading partners;
- Standards to automatically CAPTURE data that is carried directly on physical objects (bridging the physical world with the world of electronic information), such as barcodes;
- Standards to SHARE information, both between trading partners and internally, providing the foundation for electronic business transactions and visibility – knowing exactly where things are at any point in time, or where they have been, and why.

3.2 Choice of two scenarios

Versatility of GS1 standards and complexity of field situation make it possible to imagine hundreds of different scenarios for application of traceability systems for python skins.

As it has been decided to compare only two scenarios, they are intentionally quite different from each other:

- Scenario 1 is similar to food traceability and aims at **quick implementation and low investment cost**, especially for small actors.
- Scenario 2 includes **tagging and targets state-of-the-art traceability**, similar to pharmaceutical products or high consumers' expectations (*fTrace*[12]).

3.3 Description scenario 1

Scenario 1 deals with the shipments of batches of skins from processing facilities or farms in exporting countries. In this scenario, individual skins are not marked or tagged. Instead, it is the batches of skins being shipped that are individually marked.

This scenario uses two GS1 identifiers: GTIN and SSCC

3.3.1 GTIN: Global Trade Item Number

These numbers are universally known because their barcodes are used in nearly all shops in the world generating more than five billion scans per day.

GTIN provides a unique and unambiguous identification number for every trade item, which is applicable **worldwide** in open environments.

[12] fTrace is a traceability system for fish products giving to end consumer information about catch area, method of fishing, name of the boat, date of fishing… (more details in Appendix H)

While a python skin is a trade item, it is allocated a unique identification number (13 digits), which remains the same as long as it is traded. Allocation of GTINs for endangered species will be managed in the CITES/WCMC species database and automated data capture will be made by barcodes EAN-13.

Example:

Item description/process status/Source code	GTIN-13	EAN-13
Python reticulatus/Raw skin/Source code W	7612345678900	
Python reticulatus/Tanned skin/Source code W	7612345678917	

The advantage is that unless the skin is processed, it does not change of identifier, anywhere in the world, whether the python is named reticulated or reticulatus. Identifying all types of python skins differentiating by species, process status and source code should require less than 200 GTINs.

3.3.2 SSCC: Serial Shipping Container Code

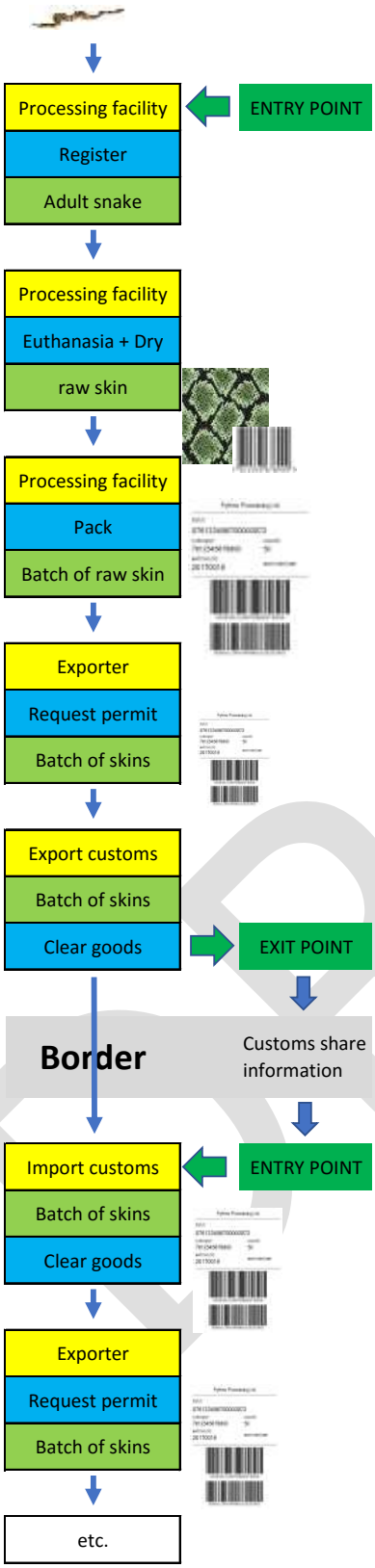
The Serial Shipping Container Code can be used by companies to identify a logistic unit, which can be any combination of trade items packaged together for storage or transport purposes such as a case, pallet or parcel. It is usually printed (barcode) on a specific label on the packing.

SSCC has now become very popular in both domestic and international trade because it simplifies the checking procedures and allows easy batch tracking.

It is also on the key identifiers for World Customs Organisations, in combination with GTIN to track and deter illegal trade.

3.3.3 Process description

Physical flow



The most logical starting point for a traceability system for python skins is at the processing facility (Ashley, 2013).

At the facility all snakes are booked in a register.

After euthanasia and drying, skins are labelled with a permanent sticker containing a barcoded GTIN.

When the processing facility ships raw skins to the next point within the supply chain, batches are packed separately by skin type (GTIN + Batch).

Each pack is labelled using SSCC printed on a low-cost printer.

Shipment is either transmitted by internet to the national CITES Management Authority, or by mail (duplicate of the SSCC label), indicating the registered exporter.

The exporter confirms reception of skins by entering SSCC in CITES MA traceability database.

The exporter must hold an internal traceability system when he wants to mix different batches, but always with same GTIN
When the exporter requests a CITES permit, they are required to provide the national CITES Management Authority with the SSCC numbers (batch numbers) of purchased skins, GTINs and quantities.

When permit is issued, permit# and SSCC# are transmitted to customs either through single window or dedicated EDI
Export customs decide wether they inspect the goods. Scanning SSCC and GTIN helps them to score whether shipment should be inspected or not.
In case of inspection, IPM/WCO tool gives quick access to the species database with pictures and traits of the specimen, just by a simple scan.

When the importer requests a CITES permit, they are required to provide the national CITES Management Authority (import country) with the SSCC numbers (batch numbers) of purchased skins, GTINs and quantities.

When permit is issued, permit# and SSCC# are transmitted to customs either through single window or dedicated EDI
Import customs decide wether they inspect the goods. Scanning SSCC and GTIN helps them to score whether shipment should be inspected or not.
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When the exporter requests a CITES permit, they are required to provide the national CITES Management Authority with the SSCC numbers (batch numbers) of purchased skins, GTINs and quantities.

Remote process facilities

Some processing facilities have no electricity or internet access. They may only rely on slow postal services. For these remote users, the national CITES Management Authority may send pre-printed product stickers and SSCC labels. The SSCC label will include a packing list with preprinted barcoded GTINs allowing quick entering of shipped quantities when received by MA.

Tanning process in range state

Tanneries should manage their own traceability system: record SSCCs for inbound and outbound products and manage product flows with batch traceability so that any outbound shipment may be tracked back to inbound SSCC. As tanning is made on individual items, batch tracking is quite easy.

3.3.4 Process description in process country

When goods are received at the tannery, SSCCs are scanned and entered into the traceability system of the tannery.

3.3.5 IT equipment and conditions for success

Processing facility or tannery

This scenario requires light IT equipment (PC + printer, worth around 300$) at processing facilities and SSCC printing application. Scanning may be done using standard laser scanners (<100$) and labels may be purchased from major stationary providers. SSSC labels may also be printed on blank sheets to save self-adhesive labels costs. Many software for SSCC label printing are available (also as freeware).

Alternative solutions for remote facilities has been described above.

Capacity building should come from MA (recommendation for standard equipment PC + Printer) and free supply of software for labels printing.

National CITES Management Authorities

National CITES Management Authorities need to use a database for traceability of SSCCs, which may be developed by a local software company. If they already use applications for export permits, additional features are quite simple. As technologies involved are widespread, MA should require only assistance for project implementation. Such assistance may be provided by GS1 MOs[13] (GS1 Member Organizations) who support members daily.

Based on a volume of 150,000 skins per annum, the estimated volume of SSCCs to be scanned is around 6,000 to 12,000 per year (i.e. 300 to 600 per work day). This means probably one person for scanning and administration, but it's likely that the traceability system will reduce other administrative activities. To save time, specific development may be needed, for which regional software companies have capacity and knowledge (web-apps or single window environment).

[13] GS1 Member Organizations exist in nearly all south-east Asia countries: Indonesia, Malaysia, Vietnam, Singapore… Full list on http://www.gs1.org/contact

3.3.6 Improvements and gaps in the chain of custody

This table shows:

- how the traceability system will help detecting and deterring illegal trade;
- how remaining gaps may be reduced by taking additional measures such as authenticating methods.

	Range country	Intermediate country	Process country
Improvements	- This system allows full traceability because it complies with the one step up/one step back concept. - Shipments recording will make exported skins traceable back to the processing facility - by using a business intelligence tool, MA may detect sudden increase of a species in a remote processing facility, raising suspicion about laundering	Introduction of SSCCs will mitigate use of blind permits for laundering of illegal skins.	introduction of SSCCs makes it much harder to mix smuggled batches with legal batches
Gaps remaining	Registering skins from other countries at processing facility cannot be stopped by traceability method.	Traceability system will ensure matching import and export of physical quantities, but will not ensure that exported skins on both permits are the same.	
How to reduce the gap	Using an authenticating method such as skinning pattern per year and per country. Feeding the circuit with undeclared skins from previous years or with other countries patterns may be instantly detected, because it will not match the production date mentioned on the SSCC label. Regular or surprise stock taking in case of suspicion: compelled labelling of all skins with GTINs will make the process much faster.	Checking source code through use of stable isotope elemental analysis can effectively ensure the origin of skins and source of skins entering trade. However, these techniques are costly, and can realistically only be used on small samples of skins within batches rather than every skin[14]. Customs may use their IPM App in case of suspicion.	Customs may use the WCO IPM App in case of suspicion.

[14] See Appendix about "Serpent's Source"

3.4 Description of scenario 2

Scenario 2 deals with the shipment of individually marked or tagged python skins.

Traceability system is event-based (refer to figure 5) and needs additional GS1 identification keys:

- Serial number of the GTIN (SGTIN) to answer the question "What";
- The location (Global Location Number) to answer the question "Where".

3.4.1 Serialized trade items (SGTIN)

Individual trade items can be uniquely identified using a GTIN plus serial number (SGTIN).

In the previous example of Python reticulatus/Raw skin/Source code W, let's suppose that the MA of a range country decides to give serial number starting from AW000001, then AW000002, etc.

The skin with serial number AW006930 will be so identified:

Item description/process status /Source code	SGTIN	Datamatrix
Python reticulatus/Raw skin/Source code W	(01) 7612345678900 (21) AW006930	

As SGTIN may also be encoded in RFID tags, a tamper proof tag may carry this information in 4 forms: the 3 described above plus SGTIN encoded in a RFID label. More possibilities are described in Appendix A.g. Nevertheless, the price of tag will increase in proportion of complexity.

3.4.2 Global Location Number (GLN)

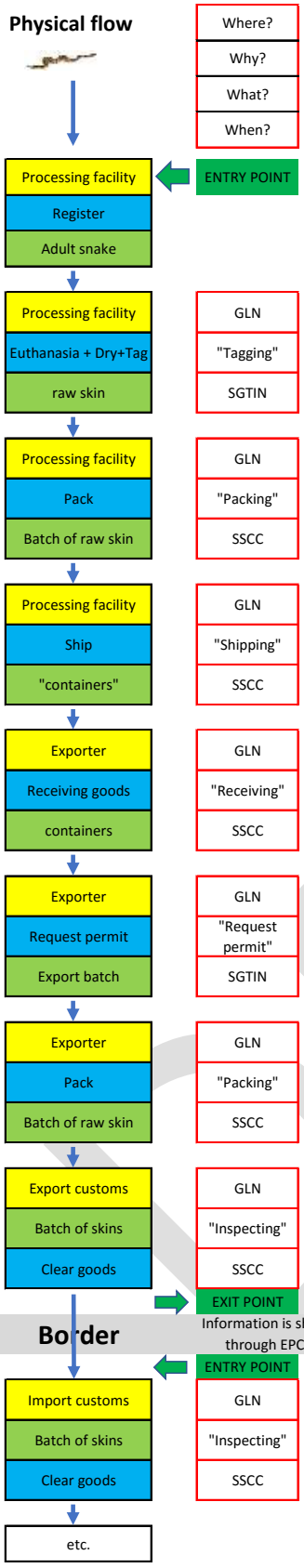
This code (13 digits) can be used as a standard location identifier by all relevant parties. The GLN is widely applied in EDI[15] messaging because is critical to message processing.

ITC[16] has developed jointly with GS1 the Global Farm Registry, which distributes freely GLN to farmers.

Free GLNs could be delivered by range countries MAs to all registered actors of the supply chain (Processing facilities, tanneries, traders…) in order to give them an unambiguous identification.

[15] Electronic Data Interchange
[16] International Trade Centre (ITC) is the joint agency of the World Trade Organisation and the United Nations. ITC's mission is to foster inclusive and sustainable economic development.

3.4.3 Process description



These are the 4 informations which will be sent at each "visible event".

The database will be managed by MA which may know at all times precise locations and process status of traceable assets.

All skins are serialized and may be individually taced.

When? Is not detailed because it is a date and time stamp of the event when recorded in the system.

The most logical starting point for a traceability system for python skins is at the processing facility (Ashley, 2013).

At the facility all snakes are booked in a register.

After euthanasia and drying, skins are labelled with a tampered proof provided by MA which displays (in both human readable and barcoded forms): species, process status, source code, serial#, year .
Each serial number is booked in the register. The tag is scanned through an App (which associates the event "tagging" to the GLN) and entered in the event database.

Before the processing facility ships raw skins to the next point within the supply chain, batches are packed and association is made between SSCC, GLN and SGTINs.

Each pack is labelled using SSCC printed .

Each skin is associated to SSCC by optical or radio-frequency reading in case of RFID tags.

Shipment is either transmitted by internet

Shipment date and time is transmitted with SSCCs, GLN of shipping location, GLN of receiving location. As SGTINs are associated with SSCCs, location of each individual skin is traceable.

"Containers" may be plastic bags, crates... carrying a SSCC label and containing skins.

Receiving date and time is transmitted with SSCCs, GLN of shipping location, GLN of receiving location. As SGTINs are associated with SSCCs, location of each individual skin is traceable.
When the exporter requests a CITES permit, they are required to provide the national CITES Management Authority with the SSCC numbers (batch numbers) of purchased skins, GTINs and quantities.

The exporter asks for export permit by giving individual item serial numbers (SGTINs). Approval of national CITES MA may be automated, because the system knows that the exporter already owns the skins.

Each skin is associated to SSCC by optical or radio-frequency reading in case of RFID tags.

Each pack is labelled using SSCC printed . Each SSCC is associated to the export permit.

Each skin is associated to SSCC by optical or radio-frequency reading in case of RFID tags.

When permit is issued, permit# and SSCC# are transmitted to customs either through single window or dedicated EDI

Export customs decide wether they inspect the goods. Scanning SSCC gives access to list of individual items list with serial numbers.
In case of inspection, IPM/WCO tool gives quick access to the species database with pictures and traits of the specimen, just by a simple scan. If Radio Frequency reading is available, serial numbers of 100 skins may be scanned in one second.

EPCIS (Electronic Product Code Information Services) gives selected access to all stakeholders (B2B, B2G). For instance custom officers will only have access to the information needed for inspection but not to the full pedigree of each skin.

When permit is issued, permit# and SSCC# are transmitted to customs either through single window or dedicated EDI

Import customs decide wether they inspect the goods. Scanning SSCC gives access to list of individual items list with serial numbers.
In case of inspection, IPM/WCO tool gives quick access to the species database with pictures and traits of the specimen, just by a simple scan. If Radio Frequency reading is available, serial numbers of 100 skins may be scanned in one second.

Imaging technology

Some tentative projects are made to authenticate skins using images. Even if they have not yet reached the "proof of concept" stage, GS1 standards already associate images with items[17].

3.4.4 Process description in intermediate country

The same level of traceability is performed: each individual skin maybe traced anywhere and anytime, except if it leaves the official circuit.

3.4.5 Process description in process country

When goods are received at the tannery, tags are scanned. Skins may be detagged for tanning process. Tannery tracing system must show that they don't sell more skins than legally acquired.

3.4.6 IT equipment and conditions for success

Tag: tamper-proof or not? Detagging-retagging allowed?

Tamper-proof tagging is a matter of controversy:

- It has proved to be successful for crocodilians;
- Crocodilian supply chains are different as already seen in 2.4.2; another main difference is the tanning process, as crocodile tags support easily the process because[18]:
  - They are not as compressed as in the case of python;
  - Crocodile skins are thicker and more consistent, so the tag will "hide" in the skin during the tanning process.

So detagging-retagging should be allowed, as long as it is traced in the tannery system.

In one of the most advanced traceability systems, i.e. pharmaceutical, most of the traceability is done by batch. Serializing comes at the packaging stage, just before distribution, when official and counterfeited drugs may meet in the legal circuit.

Equipment and technology needs at the processing facility or tannery

For effective implementation of the traceability system described in Scenario 2, processing facilities and tanneries require at least a smartphone to scan tags and associate them with a SSCC code. Alternatively, serial numbers have to be recorded with care in the skin register at the facility, and periodic control should be made.

Obligations of the national CITES Management Authority

Alternatives are:

- National CITES Management Authorities will be required to organize a tag supply chain (sourcing, stock keeping, forwarding, recalling…);

[17] GS1 identifier GDTI (Global Document Type Identifier) allows to link any type of document (photo, DNA Barcode…) stored in a database to a specific item identified by a serial number. See glossary in Appendix H.
[18] Information from UNIC (Italian's tanner association)

- to adopt an EPCIS (Electronic Product Code Information Services)[19] architecture based on event data. The advantage is that it won't need to use tamper-proof tags but only permanent labels.

3.4.7 Improvements and gaps in the chain of custody

This table shows:

- how the traceability system based on tags of individual skins will improve the legality of trade,
- how remaining gaps may be reduced by implementing additional measures such as authenticating methods

	Range country	Intermediate country	Process country
Improvements	Shipments recording will make exported skins traceable back to the processing facility. Mandatory tagging of stockpiles will bring more control.	Individual tracking leaves little margin to smugglers.	introduction of EPCIS makes it much harder to mix a smuggled batch with a legal batch
Gaps remaining	Registering skins smuggled from other countries at processing facility cannot be stopped by traceability method. And once they are tagged, they cannot be detected any further.	It is always possible to try shipping smuggled skins among legal skins!	It is always possible to try shipping smuggled skins among legal skins!
How to reduce the gap	- Using an authenticating method such as skinning pattern per year and per country. Feeding the circuit with undeclared skins from previous years or with other countries patterns may be instantly detected, because it will not match the production date mentioned on the SSCC label,	Customs may use their IPM App in case of suspicion. Associating more information to the skin (length, width…) will make almost any fraud detectable.	Customs may use their WCO IPM App in case of suspicion.

[19] EPCIS is in use worldwide for tobacco control (Excise tax) and pharmaceutical (anti counterfeit). See more information about EPCIS in Appendix E.

4 Comparison of scenarios

Details of assessment see Appendix H.

Criteria	Scenario 1	Scenario 2
Minimum costs for the system to be successful	☆☆☆☆	☆
Minimum requirements for the system to be successful	☆☆☆☆	☆
Impact on legality of trade	☆☆	☆☆☆
	1 Winner	

5 Python traceability systems cannot be successful while illicit trade persists

This study has focused on two scenarios for implementation of traceability systems combatable with GS1 standards. The first scenario is based on the minimum use of traceability keys, primarily the universal GTIN (the well-known barcode present in all retail stores to pay for products) and the serial container code to trace batches for transports either inside the country or for import-export flows. The second scenario follows the CoP17 Resolution on Snakes to tag all python skins as soon as they enter the supply chain, and offers serialized traceability to be consistent with serial numbers on tags.

However, before either of these scenarios can be successfully implemented, it is critical that CITES Parties identify entry points for illegal skins into the supply chain, and improve management systems to prevent and/or minimize incentives for illegal trade to take place. Without addressing these issues, the traceability systems described in this report will not be capable of verifying and authenticating trade in python skins, and hence would not meet the GS1 standards or ensure legal and sustainable trade in python skins.

For example, the traceability systems described in Scenarios 1 and 2 cannot prevent illegally smuggled skins from entering a processing facility before the first step in the traceability system. Tagging or recording of skins at this point may result in authorities inadvertently allowing illegal skins to enter the legal supply chain.

This example deals with direct clandestine smuggling of skins, which is not possible for a traceability system to address. To prevent this, and to allow any traceability system for python skins to operate effectively, the CITES community should focus their efforts on addressing the drivers or incentives for illegal trade. Experts suggest that the most significant drivers of illegal activity are the inappropriate implementation of quotas and trade restrictions as management tools (Natusch et al. 2016).

Addressing these drivers may be the most important task the CITES Parties can undertake to ensure the proper functioning of any python skin traceability system.

6 Conclusions and Recommendations

6.1 Traceability options

Implementation of scenario 1, based on batch traceability, will offer considerable improvements in traceability with moderate investment and local efforts.

Batch traceability cannot close all illegal circuits, because some start even before the first entry point. Using a complementary skinning pattern would reduce furthermore gaps in the chain of custody and solve most of stockpiling issue.

Based on proven standards widely spread in the world and even in range countries, such solutions are easy to develop and roll-out.

Use of GS1 standards will allow considerable savings (improved speed of process due to digitalization) for most actors which will probably be higher than incurred costs and bring benefits for all actors including MA which may increase permits revenues.

This traceability system could even further support CITES e-Permit project as well as single window projects.

6.2 Scalability

After implementing such a system, and considering benefits, some MAs may decide to switch to more detailed traceability based on INDIVIDUAL SKIN TAGGING.

By using GS1 standards, investments are protected because going from scenario 1 to scenario 2 will be easy when range countries go down the learning curve (i.e. about 5-10 years[20]). Further GS1 standards are used upstream and therefore brings information processing benefits to all supply chain partners.

6.3 Illegal trade

A traceability system for pythons cannot be successful if high levels of illegal trade and incentives for circumventing legal supply chains persist.

Implementing Scenario 1 while at the same time adapting management processes would significantly raise the bar against criminal energy and contribute to accurate data for scientific findings.

Illegal trade can be further reduced through the implementation of individual tagging for python skins with tamper proof tags (rather than batch tagging). Although it would not prevent all cases of illegal trade, when combined with additional measures (such as skin cutting patterns) it would make it considerably more difficult for skins of multiple origins and sources from being mixed in intermediate countries. This would require traders engaging in illegal trade to inject skins into the earliest point in the legal supply chain (the processing facility), allowing targeted enforcement at these sites.

6.4 RECOMMENDATIONS

1) GS1 recommends that the first and most important step is for the CITES community to examine the drivers of illegal trade. Range states are encouraged to amend management protocols to mitigate circumvention of any traceability systems that are implemented.
2) GS1 recommends establishing a holistic traceability and authenticity approach focused on batch traceability and a limited number of identification keys and technologies,

[20] Which is quite fast compared to 42 years of history since the first barcode was scanned at point of sale.

3) GS1 recommends that all CITES countries should describe the traceability component systems to have a synthetic view of their policy claim, law enforcement measures and expectations to facilitate collaboration between parties including information exchange,
4) GS1 wishes to start cooperation between MA and MO (i.e. GS1 *non-for-profit* Member Organization established in most range countries) for capacity building,
5) GS1 proposes to deepen relationship with WCO to design better connections between GS1 standards and single window/e-permit approach.

A. Understanding the GS1 system of traceability standards

a. Introduction

This chapter provides an introduction to the GS1 standards and the role they can play in Python traceability management.

b. GS1 system of standards

The GS1 system architecture is based on three concepts that are linked to each other:

- Standards to IDENTIFY entities in electronic information that can be stored and communicated between trading partners.
- Standards to automatically CAPTURE data that is carried directly on physical objects (bridging the physical world with the world of electronic information).
- Standards to SHARE information, both between trading partners and internally, providing the foundation for electronic business transactions and visibility – knowing exactly where things are at any point in time, or where they have been, and why.

Figure 4 GS1 System of standards

Note: Although GS1 offers a comprehensive set of standards, including standards for electronic communication, it is very well possible to leverage the identification and capture standards utilized by companies in combination with customs and OGA (Other Government Agencies) standards and solutions. One such example is the support for GS1 keys in the WCO data model.

c. GS1 Keys

GS1 Identification Keys are unique identifiers that provide companies with efficient and precise ways to access information about their supply chain entities, and provide this same information to their global trading partners.

GS1 keys deliver value to companies by providing secure and portable identifiers for all entities involved in their supply chains: locations, products, cases, pallets, assets, logistics units, documents and more. And when the identification data is automatically captured and shared with trading partners, GS1 keys enable companies to seamlessly connect the physical flow of products to the products' information, leading to increased visibility of the products as they travel through the supply chain.

The global uniqueness of GS1 keys makes them especially suitable as identification and reference mechanisms in an international context, enabling interoperability across systems of importers, exporters, logistic service providers, clearing agents, customs agencies and OGAs.

GS1 keys can help to enhance data quality in declarations and documentation, since they correspond with electronic records in databases that can be used to verify information. This also increases transparency and trust, which will help traders to qualify for trusted trader programs.

GS1 keys also add value when tracking and inspecting goods in transport. Scanning a barcode will ease access to related information during inspection, and also will enable the efficient recording of structured data on border procedure related events to enable status monitoring.

d. GS1 Global Traceability Standard (GTS)

Traceability system requirements define business rules and minimum requirements to be followed when designing and implementing such a system. GS1 standards (such as GS1 BarCodes, EPC/RFID, GS1 eCom, GS1 EPCIS, and more) enable the easy implementation of the GS1 Traceability Standard.

e. GS1 Keys to be considered for python trade traceability

4 keys have to be considered for python skin trade: GTIN, SGTIN, GLN and SSCC.

f. Global Trade Item Number (GTIN)

The main benefit of the GS1 System for trade items is that it provides a unique and unambiguous identification number for every trade item, which is applicable worldwide in open environments.

Identification

The GTIN is the most widely implemented GS1 standard. Companies use the GTIN to identify products in point-of-sale and order-to-cash processes.

Each trade item that is different from another in design and/or content is allocated a unique identification number (12 or 13 digits), which remains the same as long as it is traded.

Example of GTIN-13: 7612345678900

Capture

On most products traded in Retail Consumer Packaged Goods, the GTIN is present in barcoded form. Most common data capture for GTIN-12 is done using UPC12, and EAN13 for GTIN-13. Example:

The GTIN can be used to identify types of products at any packaging level (e.g., consumer unit, inner pack, case, pallet). Groups of trade items with similar production and usage characteristics such as production batches can be further identified with the help of the batch / lot number, production date, and similar data elements.

Application to python trade

Issuing GTIN is very easy[21]. CITES needs to select items to be traded and give sequential number (no logic is needed). In the case of python, it is probable that there would probably 5 to 6 GTIN per species (according to source code wild/farmed and process status), meaning a list of around 200 GTINs.

g. Serialized trade items (SGTIN)

Individual trade items can be uniquely identified using a GTIN plus serial number (SGTIN).

Identify

The serialised identification of trade items, which enables total connectivity of information and communication systems, is achieved through the use of Application Identifier AI (01) GTIN and AI (21) Serial Number.

Example: GTIN-13: 7612345678900 with serial number: AW006930 will be identified as

(01) 7612345678900 (21) AW006930

Capture

Capture can be made on :

code GS1 128, datamatrix, Databar RFID.



Advantage of GS1 128 is the possibility to read it with low cost linear scanners; inconvenience is space. Upsides of datamatrix are small space, possibility to add much more data; drawback are the necessity to use more costly image scanners, but which may be replaced by any Android smartphone.

It is also possible to combine several capture methods on a single label[22]

[21] For GS1 members. CITES is invited to join GS1 like many other UN organizations e.g. UNHCR, WHO…
[22] A major sport retailer has serialized all its products with SGTIN (even worth less than 3 €) and labels them with a RFID sticker printed with Databar.

Application to python trade

SGTIN may be used on:

- (tamper-proof or not) tags issued by the MA,
- printed on blank labels at the processing facility : serial number could be given by the register (e.g. #book + #page + #line).

As the serial number structure is free within a range of 20 digits, there will be no change for MAs in numbering, i.e. no adaptation effort.

Barcoding tags

Traceability starts at processing facility, where all snakes are booked in a register. After euthanasia and drying, skins are tagged and serial numbers are noted in the register. Tags are provided by MA and display following information[23]:

Information	Human readable	EAN-13	Datamatrix	RFID
Range state	Alpha-2 ISO country code		AI (422) ISO country of origin	
Species	Short name (3 letters)	GTIN-13	AI (01) GTIN	
Process status	RAW, CRU (crust), FIN (Finished)	Process status is embedded in GTIN because they are different commercial products		
Serial#	Numeric		AI(21) Serial number	
Source code	Alpha-1 CITES source code	Source code is embedded in GTIN (e.g. Python molurus raw skin has a different GTIN when it has code W, or R)		
Year	2 digits		AI(11) date of production	

h. Global Location Number (GLN)

GLNs can be used as a standard party/location identifier by all relevant parties. The GLN is widely applied in EDI[24] messaging because is critical to message processing.

Identify

GLN have the same structure as GTIN-13.

Application to python trade

ITC[25] has developed jointly with GS1 the Global Farm Registry which distributes freely GLN to farmers.

[23] Inspired of *Tagging trials and traceability options for python skins, CoP17 technical document, Don Ashley sep.17*
[24] Electronic Data Interchange
[25] International Trade Centre (ITC) is the joint agency of the World Trade Organisation and the United Nations. ITC's mission is to foster inclusive and sustainable economic development.

Free GLNs could be delivered by range countries MAs to all registered actors of the supply chain (Processing facilities, tanneries, …) in order to give them an unambiguous identification.

i. Serial Shipping Container Code Unit (SSCC)

The Serial Shipping Container Code can be used by companies to identify a logistic unit, which can be any combination of trade items packaged together for storage and/ or transport purposes such as a case, pallet or parcel.

SSCC has now become very popular in both domestic and international trade when used with a "despatch advice" message sent by EDI, describing the content of the container. He may anticipate next step, so when the SSCC label is scanned at goods reception, action is immediately taken. SSCC are also used by customs for visits decision.

Identify

SSCC have 18 digits. First digits identify the shipper.

Capture

SSCC is usually barcoded using GS1 128 (see example at 3.5.2). SSCC labels have recommended layouts (see example in Appendix A1) giving additional information: product (GTIN), quantity, batch number, expiry date…

Application to Python skin

SSCC label is very practical and may also be interpreted without scanners and used without EDI message (but it is less productive).

B. How GS1 Traceability Standard meets CITES criteria:

- It defines business rules and minimum requirements to be followed when designing and implementing a traceability system.
- It is by far the most widely used standards for trade and traceability, with more than 5 billion scans per day of GS1 barcodes (often known as EAN or UPC barcodes), whether in point of sales or logistics operations;
- All GS1 standards are ISO compliant or GS1 EPCIS is the base of a new ISO standards;
- WCO uses extensively GS1 standards in border control; close collaboration between WCO and CITES would be enhanced by CITES using GS1 standards for traceability;
- Food safety and healthcare/pharma industry (e.g.FDA) make the use of GS1 standards mandatory for some products;
- Using the system is free except for commercial use where an affordable membership (1.2 million members in the world) is needed (GS1 is non-for profit organization);
- Evolutive: beyond famous barcodes, a complete family of standards has been built to cover all industry requirements and the standardization process allows the system to be completed quickly when required by members;

C. Design of scenarios

The main questions used to define possible scenarios were:

- Traceability method: which type?
- Identify: which GS1 keys to be used?
- Capture: which GS1 symbols to be used?
- Share: which data sharing methods to be used?
- Authenticate: which methods could be used to mitigate risks of fraud?
- Additional data: which other identifiers?
  - GS1 standardized
  - Non-standardized

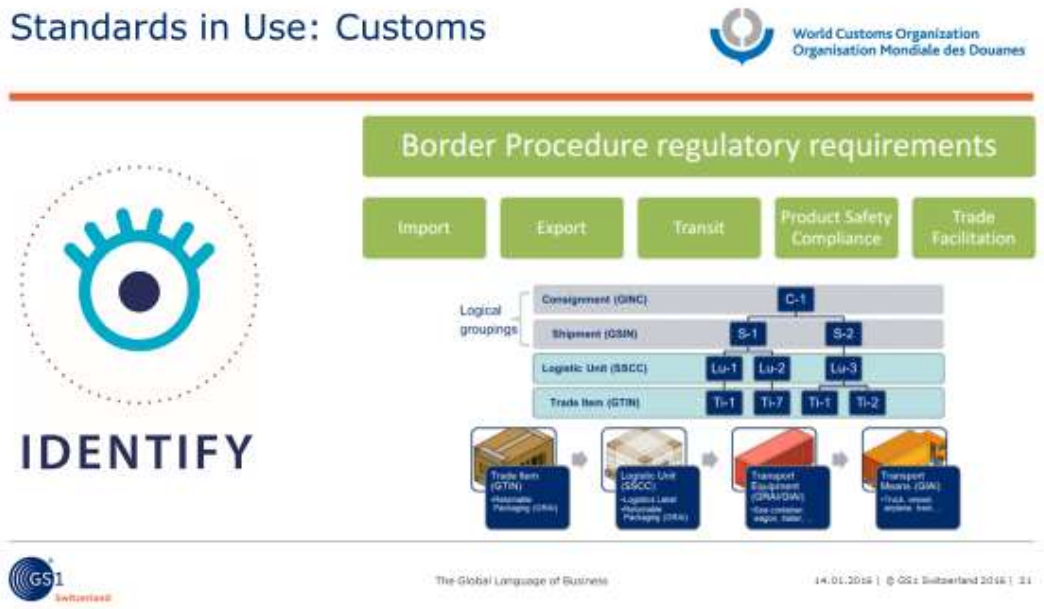
An option space table, built on 6 dimensions, shows the main possibilities:

Traceability method	Identify	Capture	Share	Autenticate	Application Identifiers (AI)	Non-standardized
Item (serialized)	GTIN	EAN-13	Specific App	Tagging	Batch number (10)	Source code
Batch	SGTIN	EAN-128	eCOM	Pin-punch method	Date of production (11)	CITES permit-number
Mass balance	GLN	Datamatrix	EPCIS	Skinning patterns	ISO Country code (426)	
Book and claim	SSCC	RFID			Regional code (427)	
Audit	GSIN				GDTI (253)	
					Length (311)	
					Width (312)	

Application identifiers allow interoperability between all actors. For example, when the skins are traded downstream, they get more value but customers want have more information. It is possible to encode length and width of the skin in the data carrier (barcode or RFID label).

2 major keys of CITES system are now missing for scenario 2 but may be created very quickly: Source code and CITES permit-number. They may be submitted to GSMP (Global Standard Management Process) and be standardized by GS1 within a year.

D. How customs uses GS1 standards and WCO databases to authenticate products through IPM



E. EPCIS traceability compliance according to ISO

EPCIS provides open, standardised interfaces that allow for seamless integration of well-defined services in inter-company environments as well as within companies. Standard interfaces are defined in the EPCIS standard to enable visibility event data to be captured and queried using a defined set of service operations and associated data standards, all combined with appropriate security mechanisms that satisfy the needs of user companies. In many or most cases, this will involve the use of one or more persistent databases of visibility event data, though elements of the Services approach could be used for direct application-to-application sharing without persistent databases.

ISO/IEC 19987:2015 is a GS1 Standard that defines Version 1.1 of EPC Information Services (EPCIS). The goal of EPCIS is to enable disparate applications to create and share visibility event data, both within and across enterprises. Ultimately, this sharing is aimed at enabling users to gain a shared view of physical or digital objects within a relevant business context.

"Objects" in the context of EPCIS typically refers to physical objects that are identified either at a class or instance level and which are handled in physical handling steps of an overall business process involving one or more organizations. Examples of such physical objects include trade items (products), logistic units, returnable assets, fixed assets, physical documents, etc. "Objects" may also refer to digital objects, also identified at either a class or instance level, which participate in comparable business process steps. Examples of such digital objects include digital trade items (music downloads, electronic books, etc.), digital documents (electronic coupons, etc), and so forth. Throughout this document, the word "object" is used to denote a physical or digital object, identified at a class or instance level, that is the subject of a business process step. EPCIS data consist of "visibility events," each of which is the record of the completion of a specific business process step acting upon one or more objects.

The EPCIS standard was originally conceived as part of a broader effort to enhance collaboration between trading partners by sharing of detailed information about physical or digital objects. The name EPCIS reflects the origins of this effort in the development of the Electronic Product Code (EPC). It should be noted, however, that EPCIS does not require the use of Electronic Product Codes, nor of Radio-Frequency Identification (RFID) data

carriers, and as of EPCIS 1.1 does not even require instance-level identification (for which the Electronic Product Code was originally designed). The EPCIS standard applies to all situations in which visibility event data is to be captured and shared, and the presence of "EPC" within the name is of historical significance only.

EPCIS provides open, standardised interfaces that allow for seamless integration of well-defined services in inter-company environments as well as within companies. Standard interfaces are defined in the EPCIS standard to enable visibility event data to be captured and queried using a defined set of service operations and associated data standards, all combined with appropriate security mechanisms that satisfy the needs of user companies. In many or most cases, this will involve the use of one or more persistent databases of visibility event data, though elements of the Services approach could be used for direct application-to-application sharing without persistent databases.

With or without persistent databases, the EPCIS specification specifies only a standard data sharing interface between applications that capture visibility event data and those that need access to it. *It does not specify how the service operations or databases themselves should be implemented.* This includes not defining how the EPCIS services should acquire and/or compute the data they need, except to the extent the data is captured using the standard EPCIS capture operations. The interfaces are needed for interoperability, while the implementations allow for competition among those providing the technology and implementing the standard.

EPCIS is intended to be used in conjunction with the GS1 Core Business Vocabulary (CBV) standard [CBV1.1]. The CBV standard provides definitions of data values that may be used to populate the data structures defined in the EPCIS standard. The use of the standardized vocabulary provided by the CBV standard is critical to interoperability and critical to provide for querying of data by reducing the variation in how different businesses express common intent. Therefore, applications should use the CBV standard to the greatest extent possible in constructing EPCIS data.

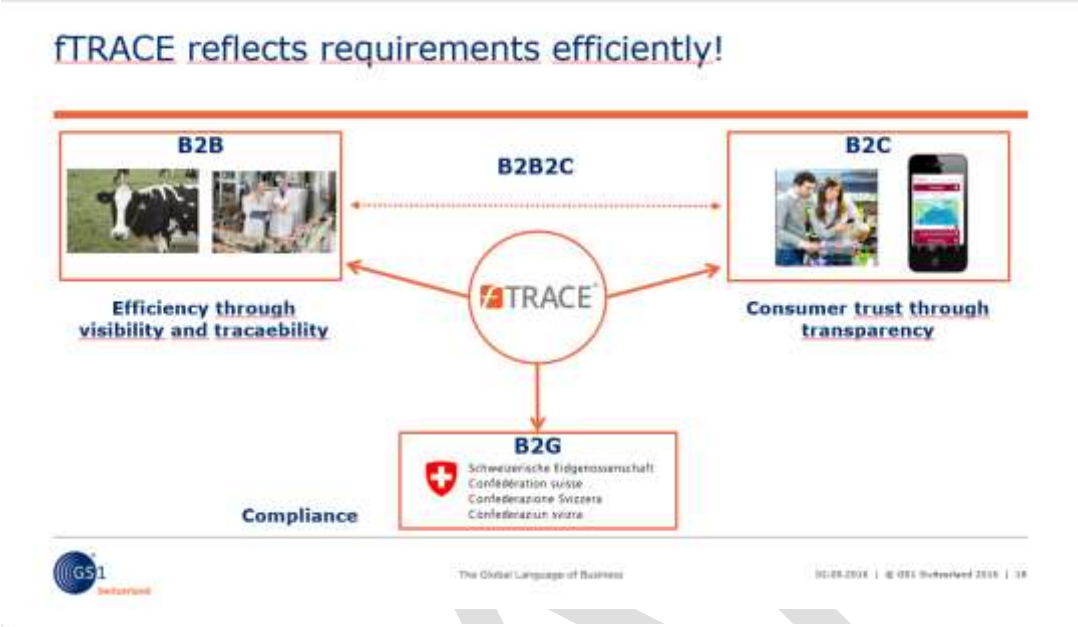
F. ABSTRACT "Serpent's source"

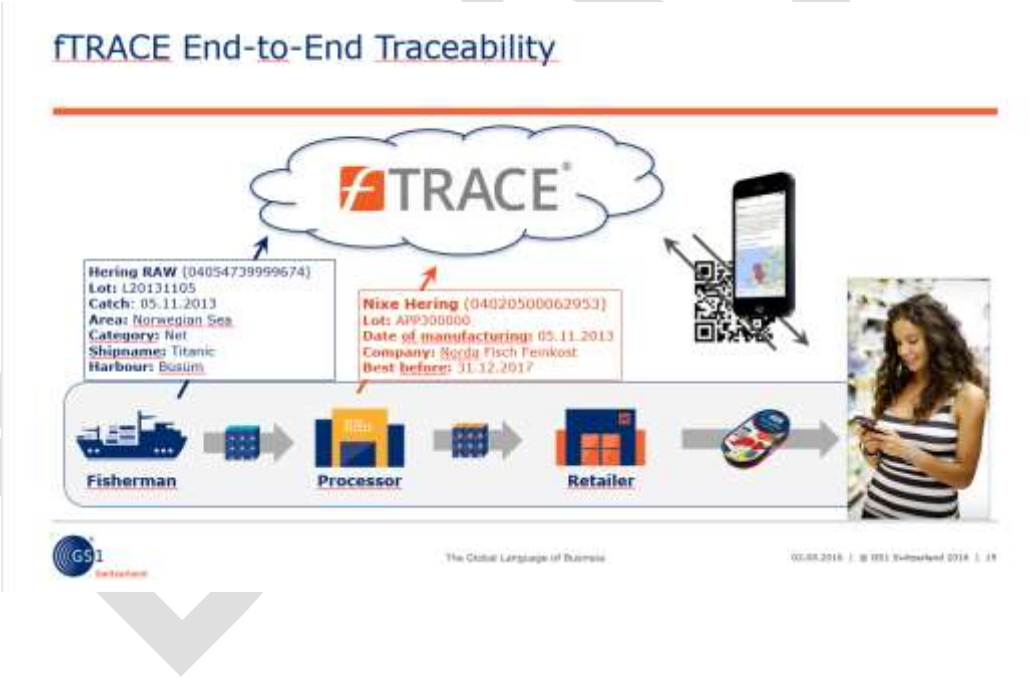
Serpent's source: Determining the source and geographic origin of traded python skins using isotopic and elemental markers (Daniel J.D. Natusch a,b, ☐, James F. Carter c , Patrick W. Aust d , Ngo Van Tri e , Ujang Tinggi c , Mumpuni f , Awal Riyanto f , Jessica A. Lyons b)

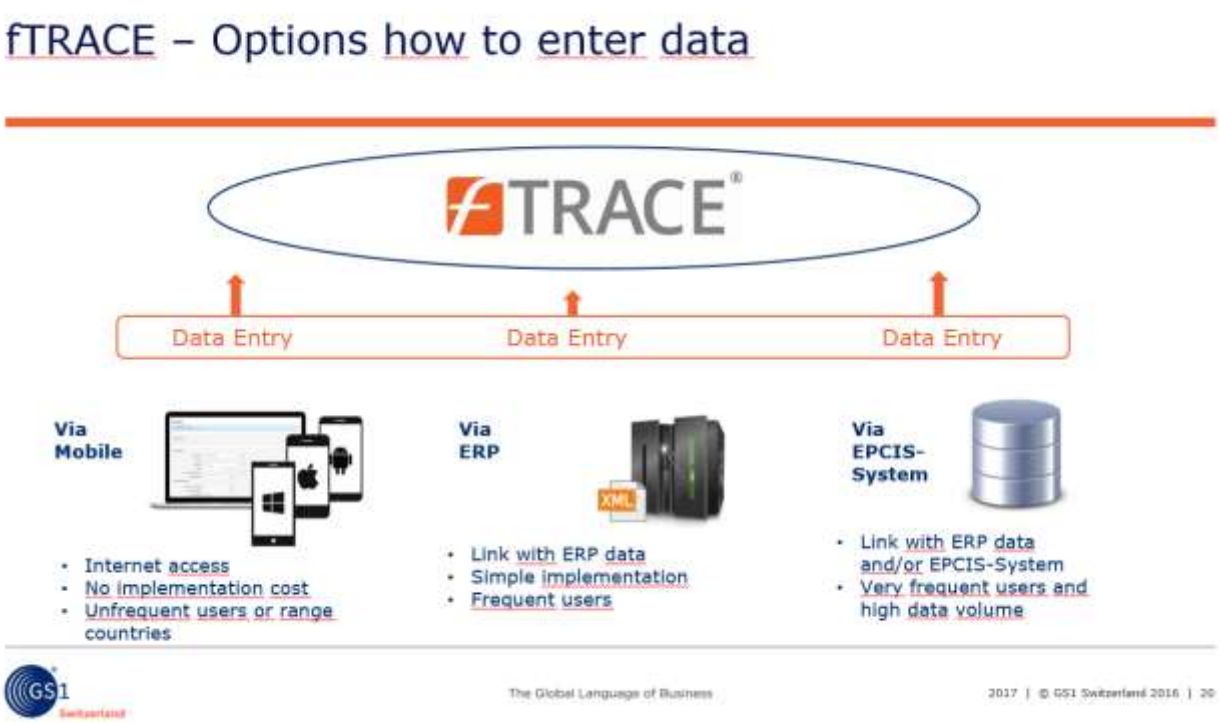
Commercial production systems for wildlife increasingly involve closed-cycle captive breeding, in which effective regulation requires methods for verifying the provenance of stock. We compared the isotopic and elemental compositions of skin from wild and captive-bred pythons raised under different diet regimes in Indonesia and Viet Nam to examine the efficacy of using these techniques as a means of determining the source and origin of skins entering international trade. We found significant differences in both isotopic and elemental markers between wild and captive-bred snakes, as well as those from different geographic origins. Combinations of both techniques were able to discriminate between diet treatments and geographic origins with up to 100% accuracy. Moreover, our experimental manipulation of python diets confirmed that the application of specific diet regimes (or the addition of known elemental markers) for captive-bred snakes can create signatures specific to those animals, vastly improving the efficacy of these methods. Our study strongly suggests that the analysis of isotope ratios and elemental markers offers a powerful tool for verifying the provenance of reptile skins entering trade – but these methodologies will be most applicable (and cost-effective) for species with small populations of genuine conservation concern, rather than for large volume trade in species for which there is little conservation risk.

G. fTrace – an event based traceability platform by GS1

fTrace is a GS1 solution based on EPCIS available globally and already used by over 330 companies in 20 countries to trace the complete processing history of fish, meat, fruit, vegetables and other ingredients B2B and B2C enriched with marketing information.







Link: *http://ftrace.com/en/gb*

H. Comparison of scenarios

Criteria	Scenario 1	Scenario 2
Minimum costs for the system to be successful		
Investment costs (CAPEX)	Limited to development costs for a database and purchase of a few scanners. An additional web/Android App would lower the OPEX. A pilot could be built for less than 50,000$ in a range country, which could be funded by the industry.	Serialized tagging gives full supply chain visibility but is an important investment. As a matter of reference, an EPCIS solution like *f*Trace represent a minimum investment of 150,000$. On top of this, investment in hardware are heavy for touchpoints where RFID readings are used.

Criteria	Scenario 1	Scenario 2
Operational costs (OPEX)	Time spent at scanning SSCC will be gained when issuing permits. Label printing and distribution should be assessed according to the number of remote processing facilities.	Depending on type of tag: ■ Permanent labels range from 1 ct to 10 ct/label in case of RFID ■ Manufacture and supply of tamper-proof tags depends on functionalities and quantities of tags/order. A tamper-proof tag would cost around 20 ct./tag. RFID inclusion is now only around 5 ct./tag. Prices are high due to small amounts (<200,000 per type) with different printings. Therefore, estimates of tagging costs for annual exports of python skins (~800,000 skins) would be approximately 200,000 per annum.
Minimum requirements for the system to be successful		
Acceptability for parties to CITES	The use of SSCC is already worldwide. Each government manages its own data, and decides what he wants to exchange with customs and other partners.	The architecture of EPCIS allows separation of data access between customs and other governmental agencies or private sector. Hence the necessity of developing governance rules.
MA capacity to design their system	Training by GS1 local organization and using a service provider should be sufficient for MA to implement the system.	Design should be centralized to reduce cost and ensure easy inter-operability
Integration of small stakeholders and remote actors	The scenario offers simple solution for remote processing facilities	Difficult due to remote conditions.
Impact on trade		
Capacity to fight illegal trade at processing facility	low	low
Capacity to fight illegal trade at later stages	medium	high
Cross-border traceability	Data exchange upon decision of MA	Data exchange upon decision of MA
Customs decisions and inspection	Supports Android-App IPM (WCO)	Supports Android-App IPM (WCO)
Trust by end customer		EPCIS allows selected access to each stakeholder.
Trust by MA in process countries		EPCIS allows selected access to each stakeholder, enhancing trust.

I. Glossary

Terms which are further explained in appendixes are marked with*

EPCIS	Electronic Product Code Information Services*
FDA	Food and Drug Administration (USA)
fTrace	Traceability solution developed by GS1 Germany to track and trace fish, meat and other products on web and mobile platform.
GDTI	Global Document Type Identifier
GLN	Global Location Number*
GS1	Global Standards 1
GTIN	Global Trade Identification Number*
Global Farm Registry	Registry giving one free and unique GLN to farmers worldwide
IPM	Web and mobile platform, developed by WCO, that allows rights holders to share relevant product information with Customs Officers in over 95 countries and growing.*
MA	CITES Management Authority
MO	GS1 non-for profit Member Organization
RFID	Radio Frequency IDentification
SA	CITES Scientific Authority
Single window	The international trade **single window** is defined as a single point at which all government data related to a trade transaction can be received and from which it can be disseminated. The central driver for single trade window projects is the need to reduce administrative costs for government as well as for traders. The sharing of services, assets, personnel and, critically, lowering the complexity of data are essential. There are a tremendous number of other factors to be considered in setting up a single window, but the essence of the concept is very simple. Why should the commercial actors in trade need to put the same data into a very large potential number of different formats depending on the border regulatory agency with which they are dealing? Almost all licences, certificates, permits and customs declarations inherit the same data from invoices, manifests and other commercial documents. There is no reason why today's IT environment cannot make it relatively simple to provide that data once only in an agreed standard format in order to satisfy all government requirements.
Source code	Code to be used on CITES permits and certificates, which informs Parties about the management system used to produce specimens and thus which provisions of the Convention apply. (W = Wild, R = Ranched, C = Bred in captivity…)

SGTIN	Serialized Global Trade Identification Number*
SSCC	Serial Shipping Container Code*
UNCTAD	United Nations Conference on Trade and Development
UN/CEFACT	United Nations Centre for Trade Facilitation and Electronic Business (UN/CEFACT) which develops standards and best practice for trade facilitation and electronic business.
UNECE Framework	United Nations Economic Commission for Europe
WCO	World Custom Organization

J. References

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